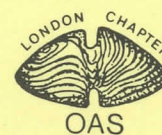




NEWSLETTER OF THE LONDON CHAPTER,
ONTARIO ARCHAEOLOGICAL SOCIETY
55 Centre Street, London, Ontario N6J 1T4



February, 1989

89-2

It's time once again for....

MEMBER'S NIGHT!!!

This year we feature three informative and interesting talks, providing a little something for everyone. Meeting time is the evening of March 9th, at the Museum of Indian Archaeology. Check out the line-up:

Eggs-actly: An Analysis of Eggshell Fragments From Long Point
Rosemary Prevec

Dracula and Richard III: What do They Have in Common?
Meagan Cook

A Summer in the Lee of Christian Island
David Smith

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EXECUTIVE REPORT

Fortunately or unfortunately, depending on your perspective, the Executive has little to report this month. Our supply of fodder for both KEWA and speaker nights is good and further arrangements for the OAS symposium do not have to take place for another month or two. We have yet to find chapter members interested in working on the planning committee for the symposium, and we are still looking. Also, no one was interested enough to submit ideas for the Prehistory of Southern Ontario cover contest. As usual, only a few die-hard members have turned up to lab nights lately, while the newsletter committee still consists of one person. Sadly, this is a sign of the times for the London Chapter: unless members of the Executive go out and twist someone's arm, no one responds to requests for help.

This is perhaps the most pressing problem the Chapter Executive must currently face. If we do not get "fresh blood" involved with the administration and organization of the Chapter, things get stale, and current Executive members rather quickly burn out. Our new Vice-President, Paul Antone, will be looking into ways of increasing local involvement, but it is up to the membership to show their interest as well. This is all the more pressing now since President Neal Ferris, who is currently in his 4th year of the Chapter presidency, has indicated that he is not willing to stand again after this year. As many of the Chapter operations have changed in the last four years, it is important that those members who might be willing to run for the presidency next year express their interest as soon as possible, so that Neal and the candidate(s) can establish a transition period through the latter part of 1989, thus enabling a continued smooth operation of activities. The trick in running an organization like the London Chapter is indeed the ability to generate a continuing and smooth turnover of people. So, if you are interested in running as a candidate for the Chapter presidency and would like to know more about it, please let Neal know soon....before it becomes arm-twisting time again!

OAS SYMPOSIUM 1989...URGENT!!!

We still have either two half day or one full day session to plan for the 1989 symposium, and we are looking for ideas. Got any? If there is a session you'd like to hear, and think it can be easily organized, please contact a member of the Executive. If it is possible to pull together, we'll do it! Also, a cash bar reception for Saturday evening (with music) is the only social activity planned for the symposium. If members have ideas on other activities, such as tours, a Friday night welcoming reception, preference for a banquet, or something else, please let us know.

EDITOR'S NOTE

Well, in light of the above, there won't be the usual plea for members to help with the production of our newsletter this month! This issue features an article by Nick Adams of the Cataraqui Archaeological Research Foundation in Kingston, and also project archaeologist for the Walpole Island community's Master Plan project. Nick's effort here at interpreting the geological history of Walpole Island and relating it to the archaeological database from the islands shows once again that archaeologists must be conversant in much more than material culture to properly understand the archaeological record in southwestern Ontario, and at the same time shows the value archaeology can have to a diverse range of disciplines and fields of research. Nick's ability to make this relatively dry material interesting should also be commended!!!

THE GEOLOGICAL FORMATION OF THE ST. CLAIR RIVER DELTA AND ITS IMPLICATIONS FOR ARCHAEOLOGICAL RESEARCH ON THE WALPOLE ISLAND INDIAN RESERVE

Nick Adams

Introduction

This paper is a revised version of a presentation made to the Eastern States Archaeological Federation, in November of 1988. In it I present some of the conflicting views of the genesis of the St. Clair delta and evaluate them in light of the archaeological discoveries which have been made during the Walpole Island project. The implications of the alternative dating scenarios are discussed in light of our findings, and some preliminary observations concerning the location of sites in relation to geological landforms, environmental conditions and resources are presented.

The Walpole Island Archaeological Project

The Walpole Island Indian Reserve occupies the eastern two thirds of the St. Clair River delta, at the junction of the St. Clair River and Lake St. Clair. It consists of six low lying islands, separated from the United States by the south channel of the St. Clair River, and from mainland Ontario by the Chenal Ecarte, or Snye (Figure 1). Approximately two thousand Ojibwa, Ottawa and Pottawatomi Indians currently reside on the 58,000 acre territory, which, although considered a reserve, is actually unceded Indian land (Nin. Da. Waab. Jig. 1987).

In 1987 the Walpole Island First Nation embarked upon a project to identify, protect and preserve prehistoric and historic sites on the delta islands. Nin. Da. Waab. Jig., the community's research department, and the Cataraqui Archaeological Research Foundation have been working together to produce an inventory of sites and to develop long term strategies for their management.

Early on in this project it became abundantly clear that gaining a full picture of the geological history of the delta islands would be a critical step in developing a deeper understanding of the human history of the area. Since the reserve is wholly situated on the St. Clair River delta, and deltas are dynamic landforms which occur under quite specific circumstances, it became obvious that if we could establish a time at which delta building began, we would also establish a Terminus Ante Quem, or earliest possible date for human occupation on the islands.

In addition, we also had to account for short term events which impacted human occupation on the islands. If one can visualize a wedge of silty sand with an average north-south surface gradient of one in four thousand, or one meter to every four kilometers, it is not hard to see the extent to which even minor fluctuations in the water levels of Lake St. Clair could lead to substantial inundations or the exposure of vast intertributary areas on Walpole Island. For instance, since 1898 water levels in Lake St. Clair are known to have varied by as much as 5.9 feet (Wightman 1961: 121). Before the construction of drainage dykes, allowing Walpole residents to turn vast areas of marsh into productive agricultural fields, seasonal inundation would have markedly affected the 'dry land' areas of the delta islands. Thus while understanding the depositional history of the delta at the broadest level is critical to developing a sense of time depth for the islands, it is equally important to comprehend the effects of more seasonal, or short term events may have had on human settlement of the area.

The Physiography of the Walpole Island Area

Bedrock Geology

Walpole Island is underlain by the black shale bedrock of the Upper Devonian, Kettle Point formation (Fitzgerald and Hradsky 1980). These rocks are so deeply buried beneath the uniform clays of the St. Clair Clay Plain that they have had little direct impact on the history of human settlement in the area. The one exception is Kettle Point Chert, which outcrops at Kettle Point, in Lambton County, at the interface of the Upper Devonian Kettle Point shales and the Middle Devonian Ipperwash Formation limestone (Janusas 1984: 2). This outcrop was extensively used prehistorically on Walpole Island as a source of raw material for the manufacture of stone tools, either by getting the material from primary sources in the Ipperwash - Port Franks area, or from secondary till deposits. Indeed, Scarlett Janusas (1984) has demonstrated that there was extensive prehistoric use of these deposits throughout much of southern Ontario.

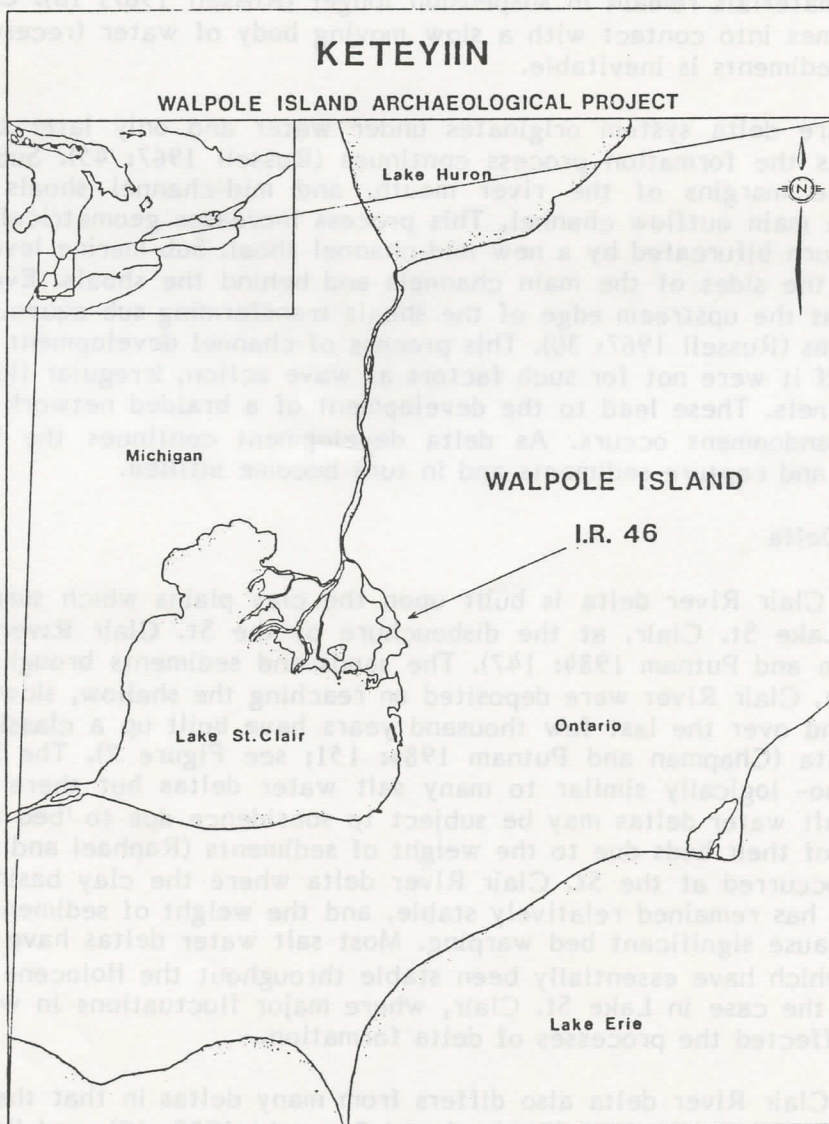


Figure 1: Location of the Walpole Island Indian Reserve

An Overview of Delta Formation Processes

The term delta is derived from the pyramid-shaped plan of the lower Nile valley, as originally described by the Greek historian Herodotus in approximately 450 B.C. (Coleman 1976: 1). In more current geological terms, a delta can be described as a coastal accumulation of river borne sediments located at or adjacent to the disbouchure of the river (Nummendal 1982: 24).

One of the main criteria for delta formation is the existence of a major river system carrying large quantities of clastic sediments, which have been aquired through the processes of erosion along the river's path, and throughout a large drainage basin (Coleman 1976: 3). Such a river can move large quantities of material along its bed, and hold vast amounts of sediment particles in suspension as long as the velocity of the current is high. As soon as the velocity decreases, materials held in suspension settle out and are deposited as alluvium. Not surprisingly, heavier materials settle out first while lighter materials remain in suspension longer (Russell 1967: 18). Once a sediment laden river comes into contact with a slow moving body of water (receiving basin), the deposition of sediments is inevitable.

The entire delta system originates under water and only later becomes visible above water as the formation process continues (Russell 1967: 45). Sub-marine levees form along the margins of the river mouth, and mid-channel shoals develop first, bifurcating the main outflow channel. This process increases geometrically as each new channel is in turn bifurcated by a new mid-channel shoal. Sub-marine levees continue to develop along the sides of the main channels and behind the shoals. Eventually islands start to form at the upstream edge of the shoals transforming sub-aqueous features into visible landforms (Russell 1967: 30). This process of channel development would continue geometrically if it were not for such factors as wave action, irregular flow patterns and silting of channels. These lead to the development of a braided network of channels as silting and abandonment occurs. As delta development continues the basins between levees attract and capture sediments and in turn become infilled.

The St. Clair Delta

The St. Clair River delta is built upon the clay plains which surround and form the basin of Lake St. Clair, at the disbouchure of the St. Clair River into Lake St. Clair (Chapman and Putnam 1984: 147). The sands and sediments brought into Lake St. Clair by the St. Clair River were deposited on reaching the shallow, slow moving waters of the lake, and over the last few thousand years have built up a classic example of a bird's foot delta (Chapman and Putnam 1984: 151; see Figure 2). The St. Clair River delta is morpho- logically similar to many salt water deltas but there are significant differences. Salt water deltas may be subject to subsidence due to 'bed loading', or the down warping of their beds due to the weight of sediments (Raphael and Jaworski 1982). This has not occurred at the St. Clair River delta where the clay basin upon which it was built from has remained relatively stable, and the weight of sediments has not been sufficient to cause significant bed warping. Most salt water deltas have been built into water levels which have essentially been stable throughout the Holocene period. This is definitely not the case in Lake St. Clair, where major fluctuations in water level have significantly effected the processes of delta formation.

The St. Clair River delta also differs from many deltas in that the flow of water through it is relatively constant (Raphael and Jaworski 1982: 10), and little sediment is held in suspension. While the Mississippi delta is predominately formed of silty-clay deposits derived from its vast hinterland, the St. Clair River delta deposits are

comprised of fine sands and coarse silts from a much smaller drainage basin (Pezzetta 1973: 170). Most of this sediment load is transported along the bed of the river and delta distributaries and is derived from the actions of erosion along the southern shores of Lake Huron (Duane 1967). Thus the seasonal inundations which are instrumental in delta formation elsewhere are only a small part of the St. Clair River delta process. Other factors, such as ice jamming of the distributaries, and fluctuations in the elevation of the receiving basin have been, and are more significant to the formation of the St. Clair River delta.

The Post Glacial History of the St. Clair Region

The origins of the St. Clair River delta are intimately related to the glacial and post glacial history of the Great Lakes. In particular, developing an understanding of the post glacial history of the Lake Huron, Lake St. Clair and Lake Erie basins is germane to comprehending the emergence of Walpole Island.

The retreat of ice sheets from southern Ontario revealed the presence of an 'Ontario Island', at first surrounded by ice, then, as the ice continued to melt back, by both ice and the waters of Lake Maumee (Chapman and Putnam 1984: 31). During all three stages of Lake Maumee the Lake Huron basin was covered with ice at c. 14,000 B.P. (Eschman and Karrow 1985: 80). Continued retreat of the ice led to the formation of a series of lakes (Arkona, Whittlesey, Warren, Grassmere and Lundy) between 13,750 and 12,400 B.P. (Eschman and Karrow 1985: 87). The whole of the Lake St. Clair region was submerged under the waters of this succession of lakes. The lacustrine clays which underly the St. Clair River delta are believed to have been deposited in glacial Lakes Whittlesey and Warren (Larsen 1985: 65). In all, three periods of the post glacial Great Lakes history have been identified during which the formation of the St. Clair River delta may have begun.

Possibility 1: As more of the Lake Huron basin became free of glacial ice and early Lake Algonquin developed (c. 12,400 B.P.), a large lake named Lake Dresden (Chapman and Putnam 1984: 24, 67) or early Lake St. Clair (Dreimanis 1964: 249) occupied the St. Clair basin. A distinct ridge which formed this lake's eastern shore can be traced between the towns of Dresden and Sombra at approximately the 600 foot contour mark.

There has been some discussion as to which direction waters were flowing along the St. Clair channel at this time. Hough (1966) has suggested that waters from Lake Dresden and the Lake Erie basin drained northwards through the St. Clair River into early Lake Algonquin and that waters in the Huron and Michigan basins were confluent, with levels controlled by the Chicago exit (Chapman and Putnam 1984: 68; Eschman and Karrow 1985: 87). This position refutes that postulated by Leverett and Taylor (1915) who suggested that waters drained southwards through the St. Clair River channel from early Lake Algonquin. This view is also supported by Wightman, who convincingly argues that proper interpretation of the gravel floors of the channels on the Port Huron moraine and a more accurate understanding of their elevations makes a northward flow impossible at that time (1961: 69). If Hough is correct and waters were indeed flowing north, obviously no delta formation could have occurred at Lake St. Clair. Had water been flowing south the possibility that delta building could have occurred does exist, however the nature and duration of this flow is assumed to be such that significant delta building would not have happened, and even if it had the deposits would have been removed by falling waters during the Two-Creeks Interval (Pezzetta 1968: 119). In addition, the union of the river and early Lake St. Clair would have stood well to the north of the current delta, between Sombra and Courtright, and would thus have not impinged on the current delta bed.

Possibility 2: With the withdrawal of the Lake Ontario ice lobe to the eastern end of the Lake Ontario basin, and the uncovering of the Mohawk Valley exit, water levels in the lower Great Lakes basin fell (Chapman and Putnam 1984: 37). Lake Iroquois occupied the Lake Ontario basin between 12,500-12,000 B.P. (Anderson and Lewis 1985: 250), and Lake Dresden was dramatically reduced in size. Further recession of the ice sheet revealed the Kirkfield or Fenlon Falls outlet to the Trent River and resulted in a short term low level in Lake Algonquin (c. 11,800 B.P.). Isostatic rebound subsequently raised the level of the Kirkfield outlet to that of the St. Clair River and Chicago outlets, resulting in the stabilization of Lake Algonquin levels and the production of pronounced shoreline features along the south shore of Lake Huron.

The traditional perception of this phase (c.11,000 - 10,000 B.P.), is that three outlets carried water from Lake Algonquin at this time; the Port Huron and Kirkfield outlets ultimately discharging through the St. Lawrence into the Champlain Sea, while water through the Chicago outlet found its way into the Mississippi River system (Chapman and Putnam 1984: 35). Recent studies (Kaszycki 1985) have cast doubt on this picture, suggesting that the Lake Algonquin shoreline lies well below modern levels in the southern Lake Huron basin. If waters from Lake Algonquin flowed south through the Port Huron exit at this time, it is conceivable that some delta building could have taken place at the disbouchure of the St. Clair River into proto Lake St. Clair. Leverett and Taylor (1915, cited in Larsen 1985: 65) suggested that the earliest St. Clair delta related to this phase, with only the delta surface dating to a later period. Unfortunately there is little to support this hypothesis since there is no clear physical evidence of this earlier period on the delta. Indeed, others have argued that Lake Algonquin never reached a level high enough to drain southwards through the Port Huron outlet (Hansel et al 1985; Kaszycki 1985). In particular, Kaszycki has argued that, based on exponential projections of the water plain from the Kirkfield area, Main Lake Algonquin water levels were approximately 430 feet at Port Huron, well below current levels, and well below the bed of the St. Clair River.

Wightman (1961: 71) has argued that at the beginning of the Main Lake Algonquin stage the lake occupying the St. Clair basin may have retained a water level closely corresponding to early Lake St. Clair (ie. 600 feet). An abandoned river channel which can be traced between Courtright and Algonac and which has a bed level at about 590 feet is interpreted as pre-dating the current channel, and was the major outflow channel during Main Lake Algonquin times (Wightman 1961: 74). Wightman argues that since the bed of this channel is high, and since it clearly crosses the current channel and can be traced across the northern tip of Walpole Island, it was superceded when low water levels in the St. Clair basin caused rapid downcutting by the 'new' St. Clair River.

The St. Clair River has a mean depth of approximately 10 meters and a maximum recorded depth of almost 25 meters near the head of the north channel (Pezzetta 1973: 171). Thus the current river is considerably deeper than Lake St. Clair and in consequence the beds of the distributaries rise into the receiving basin. One manifestation of this phenomena is that channel bars have formed in the distributary mouths, partially restricting downstream flow and merging with the sub-aqueous delta front platform. Presumably the high land at Highbanks represents either a channel bar or delta front formed when the waters flowing down the St. Clair River hit elevated water levels in Lake St. Clair.

Wightman accurately points out that there are two distinct levels on the St. Clair delta: some small areas which have a maximum elevation of 585.5 feet (at Highbanks), and the vast majority of the sub-aerial part of the delta which is considerably lower. He

interprets the high areas as the fragmented and reworked parts of an ancient (Main Algonquin) delta surface which became isolated within a generally later delta plain (1961: 77). A number of boreholes through the higher parts of the delta were interpreted as showing a "distinct stratigraphic difference between the materials of these high areas and the remainder of the delta surface" and are dated by association with radiocarbon dates from a peat layer at South Haven Michigan to be approximately 8,000 years old. Wightman interprets this date as indicating a late Algonquin age for the deposits (1961: 80).

In his 1968 study, Pezzetta critically examined Wightman's arguments for a Main Late Algonquin formation of the delta. In particular he drew attention to the South Haven date, which, re-evaluated in light of Hough's reinterpretation of Great Lakes history (1963), is too late to be an Algonquin period deposit (1968: 113). He also closely examined the topographical arguments Wightman put forward, finding no basis for the assumption of a Main Lake Algonquin correlate in the St. Clair basin at the 600 foot mark, and no reason to assume that later lake rises in the basin failed to reach the levels of the highest delta areas (1968: 119). He also suggested that the coarse sediments that Wightman attributed to the earlier delta were actually reworked deposits from the eroding Port Huron moraine, deposited during early Lake Nipissing times when a steep gradient existed between Lake Huron and proto Lake St. Clair (Lake Leverett). These sediments were seen to have been deposited at the point where the gradient of the river decreased most rapidly.

Possibility 3: Continued recession of the ice sheet towards North Bay uncovered first the Fossmill and then the Mattawa exits. The sequence of events in the Lake Huron basin between approximately 10,500 and 10,000 B.P. is characterized by a series of lake level lowerings and stabilizations which have left their mark as relic beaches around the perimeter of the modern lake. The land at the Mattawa exit lay approximately 400 feet below the Port Huron outlet (Chapman and Putnam 1984: 39), thus with the Mattawa exit breached, the waters of Lake Algonquin rushed out of this new channel, rapidly lowering the water levels in the Lake Huron basin to the unprecedented Lake Stanley low stage, well below current levels. Dates from submerged stumps and peat beds below Lake Huron suggest that the fall to Lake Stanley levels began by 10,000 B.P. (Eschman and Karrow 1985: 90). All possibility of water leaving the Lake Huron basin via St. Clair River ceased once the Fossmill exit had been breached, and thus with no major discharges into Lake St. Clair throughout the Post Algonquin and Lake Stanley stages (c. 10,000 - 5,000 B.P.), no delta development could have occurred.

This is supported by findings on Walpole Island. The surficial deposits of the St. Clair River delta consist of a thin veneer of unconsolidated sands and silts overlying a thick substrate of heavy blue clay. Organics from the surface of the lacustrine clays which underly the delta have returned dates ranging from $9,300 \pm 200$ to $6,100 \pm 80$ B.P., clearly post dating Main Lake Algonquin events (Raphael and Jaworski 1982: 17). A discontinuous layer of peat lying between the sands and the clay suggest that a low water level may have occurred in the Lake St. Clair basin prior to the formation of the delta (Wightman 1961: 79), presumably at the same time that lake levels in the Lake Huron basin were at their lowest.

Continued retreat of the glacial ice northwards and the attendant isostatic rebound gradually resulted in the raising of the North Bay outlet. Water levels in the Lake Huron, Superior and Michigan basins slowly rose, ultimately inundating the swamps and forests which had developed during the Lake Stanley low stage. As the North bay outlet reached the same elevation as the Port Huron and Chicago outlets a 'three outlet' phase of the Nipissing Great Lakes occurred (Lewis 1969, as cited in Eschman

and Karrow 1985: 90). Stabilization at this level resulted in the formation of pronounced beach ridges and bluffs throughout the upper Great Lakes (c. 5,500 - 4,700 B.P.).

Waters flowing out of glacial Lake Nipissing down the St. Clair River once again started to erode the river banks, cut away at the tills at the bottom of the river channel and transport sediments from the Lake Huron basin. Isostatic rebound occurred most rapidly in the upper Great Lakes. The North Bay exit rose above the level of both the Port Huron and Chicago outlets, heralding a new 'two outlet' stage (c. 4,700 - 3,700 B.P.) of development (Eschman and Karrow 1985: 90), although slightly later dates are postulated by Larsen (1985). The tills at Port Huron were less resistant to erosion than the bedrock sill at the Chicago outlet and eventually all the flow from the upper Great Lakes was captured by the St. Clair River (Chapman and Putnam 1984: 40). Water levels had been rising throughout the 'post Stanley' period, and it is estimated by Pezzetta that waters were standing at approximately 585 feet at the time the Port Huron exit became active again.

Larsen (1985: 75) argues that this model for the Nipissing and Algoma Great Lakes of "a simple transgression that rose to the earlier southern outlets and then fell in a step-like manner as episodic erosion took place at Port Huron", does not take into account the fact that isostatic rebound was occurring throughout the whole Great Lakes basin. While rebound was most evident in the northern parts of the basin, uplift did occur adjacent to the southern outlets. Larsen also argues that the cyclical, natural fluctuations in lake level brought about by alterations in climate, precipitation, and evaporation throughout the drainage system had a greater influence on Nipissing and Algoma lake levels than is commonly recognised. He proposes that, on the basis of recent shoreline studies in the vicinity of the Chicago exit, the Nipissing and Algoma terraces represent "periods of coastal erosion and deposition during climatic episodes favouring rises in lake level" (1984: 74). He suggests that the evidence for periods of lower lake level between these highs has been obscured by subsequent events. Erosion at the Port Huron outlet is seen as happening in a more even, and less episodic manner than that proposed by his predecessors.

But whether gradual or episodic, continued erosion of the Port Huron outlet resulted in a further drop in elevation of the waters within the Lake Huron basin until a period of sufficient stabilization occurred at about 3,000 B.P., allowing for Algoma stage beach ridges to be built at approximately 595 feet. As the Port Huron exit continued to deepen, current lake levels at 579 feet were reached approximately 1,500 years ago.

Falling water levels throughout the Great Lakes between the Nipissing and Algoma stages resulted in parts of the newly formed delta emerging relative to the water plain. By the time water levels in the Huron basin stabilized as Lake Algoma, parts of the St. Clair River delta would have become raised relative to Lake St. Clair, and available for human settlement. As the water table dropped, first the marsh then prairie grasslands would have been replaced by 'upland' forest species such as maple, walnut and oak.

The final, or on-going stage of delta building has occurred because since about 3,000 B.P. the level of Lake St. Clair has remained more stable (around 571 feet) than that of Lake Huron. So, although the water plane is lower now than it was during the construction of the pre-modern delta, delta building continues on the American side.

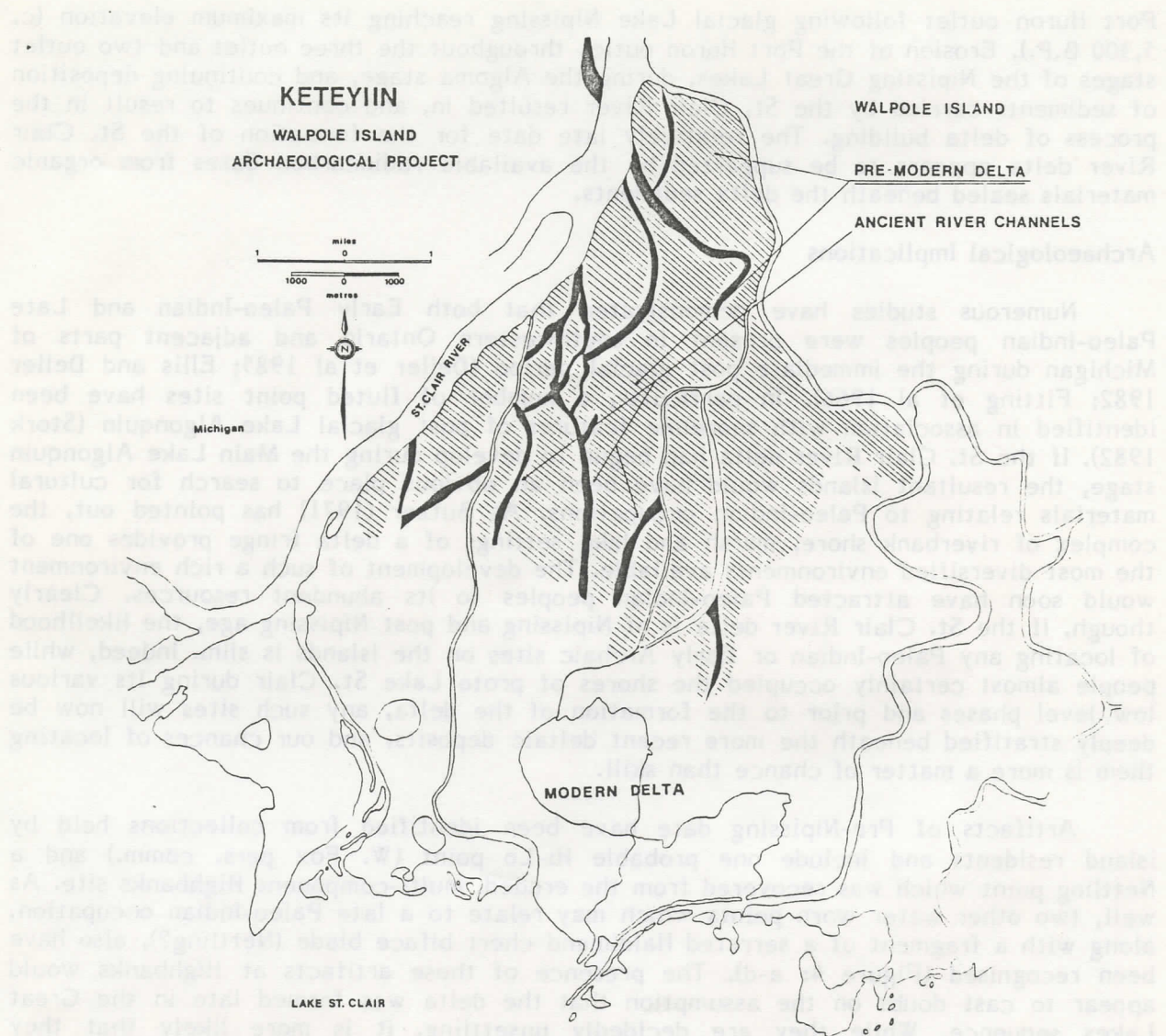


Figure 2: The Pre-Modern (c. 5,500 - 4,500 B.P.) and Modern St. Clair River Deltas, Showing the Location of Principal Former River Channels.

Notwithstanding lingering possibilities that fragments of an early delta might still be discovered, two principal delta phases can be identified (Figure 2). The Pre-Modern delta is visible as a slightly elevated, tilted plateau and is the area where modern settlement, upland forest and farm fields predominate. The majority of the Modern delta is still in its sub-aqueous stage with the higher parts supporting lush marsh plant communities at the south end of the islands.

Summary

Despite early suggestions that the St. Clair Delta may have had its genesis while either early Lake Algonquin (c. 12,400 B.P.) or Main Lake Algonquin (c. 11,000 - 10,000 B.P.) occupied the Lake Huron basin, the available evidence indicates that it is more likely that the earliest phase of delta building occurred as a result of the erosion of the

Port Huron outlet following glacial Lake Nipissing reaching its maximum elevation (c. 5,300 B.P.). Erosion of the Port Huron outlet throughout the three outlet and two outlet stages of the Nipissing Great Lakes, during the Algoma stage, and continuing deposition of sediments carried by the St. Clair River resulted in, and continues to result in the process of delta building. The relatively late date for the formation of the St. Clair River delta appears to be supported by the available radiocarbon dates from organic materials sealed beneath the delta sediments.

Archaeological Implications

Numerous studies have demonstrated that both Early Paleo-Indian and Late Paleo-Indian peoples were present in southwestern Ontario and adjacent parts of Michigan during the immediate post glacial period (Deller et al 1985; Ellis and Deller 1982; Fitting et al 1966). In particular, a number of fluted point sites have been identified in association with shoreline features of post glacial Lake Algonquin (Stork 1982). If the St. Clair River delta had begun to develop during the Main Lake Algonquin stage, the resultant islands would have been an obvious place to search for cultural materials relating to Paleo-Indian occupations. As Butzer (1971) has pointed out, the complex of riverbank shore, marsh and lake settings of a delta fringe provides one of the most diversified environments available. The development of such a rich environment would soon have attracted Paleo-Indian peoples to its abundant resources. Clearly though, if the St. Clair River delta is of Nipissing and post Nipissing age, the likelihood of locating any Paleo-Indian or Early Archaic sites on the islands is slim. Indeed, while people almost certainly occupied the shores of proto Lake St. Clair during its various low level phases and prior to the formation of the delta, any such sites will now be deeply stratified beneath the more recent deltaic deposits, and our chances of locating them is more a matter of chance than skill.

Artifacts of Pre-Nipissing date have been identified from collections held by island residents and include one probable Hi-Lo point (W. Fox pers. comm.) and a Nettling point which was recovered from the eroded, multi-component Highbanks site. As well, two other water worn points which may relate to a late Paleo-Indian occupation, along with a fragment of a serrated Haldimand chert biface blade (Nettling?), also have been recognised (Figure 4: a-d). The presence of these artifacts at Highbanks would appear to cast doubt on the assumption that the delta was formed late in the Great Lakes sequence. While they are decidedly unsettling, it is more likely that they represent the vestiges of sites which have been eroded out and reworked during the delta formation process. Keeping an open mind on the matter, however, if artifacts of a pre-Nipissing date continue to be discovered in the Highbanks area and particularly if they are found on sites away from the current shore, it may be wise to re-examine the lynch pins of the geological arguments more closely.

So far, although the project has surveyed only a fraction of the Reserve, some patterns of settlement can be suggested. There is a clear clustering of sites along the margins of former delta channels, particularly at the southern end of the island where the pre-modern delta deposits dip below the marshes of the modern delta (Figures 2, 3).

The discovery of late Middle Archaic artifacts has been restricted to the northern tip of Walpole Island. While acknowledging that the paucity of sites from this period may well be a result of the small total area surveyed, and that we may be missing key locational factors for these sites, the presence of the earliest artifacts on or near the northern tip of the delta suggests that settlement started in this area and expanded progressively south as the delta emerged.

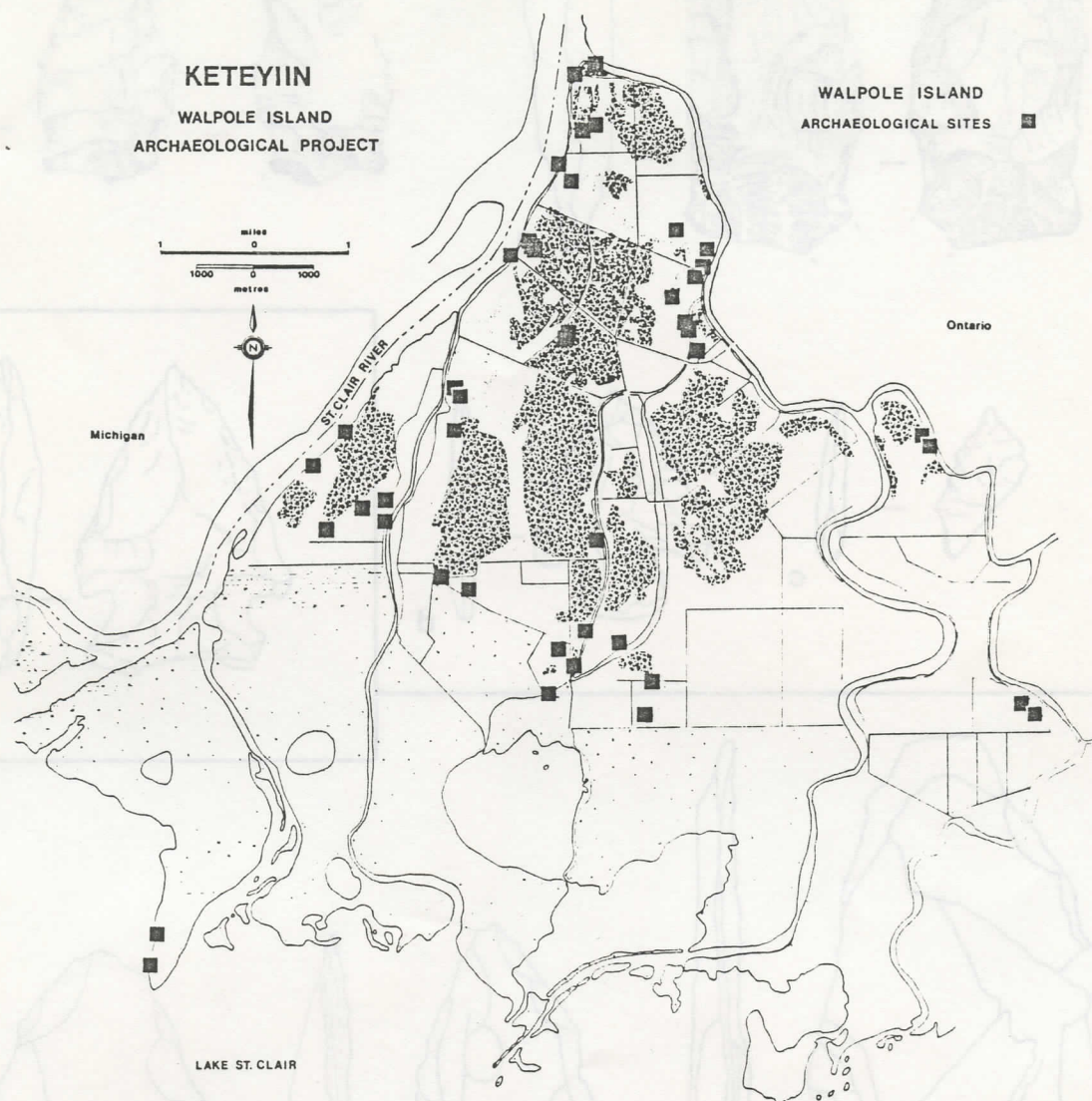


Figure 3: Distribution of Known Archaeological Sites on Walpole Island. Note the clustering of sites along the lakeward edge of the Pre-Modern delta.

Late Middle Archaic Brewerton side and corner notched points occur at the Highbanks site (Figure 4: e), as do Late Archaic period small points of Crawford Knoll and Innes types. Regular surface collection along the edge of the St. Clair River at this location has resulted in an amassing of a substantial collection of artifacts from these periods. Additional evidence of a Late Archaic occupation at the northern end of the delta comes from a private collection held by Rocky Sands. In his extensive array of material found during shoreline dyking are a number of Satchell Complex stemmed argillite Broadpoints, some Stringtown points, and an Adder Orchard point (Figure 4: f-h; Figure 5: j-l).

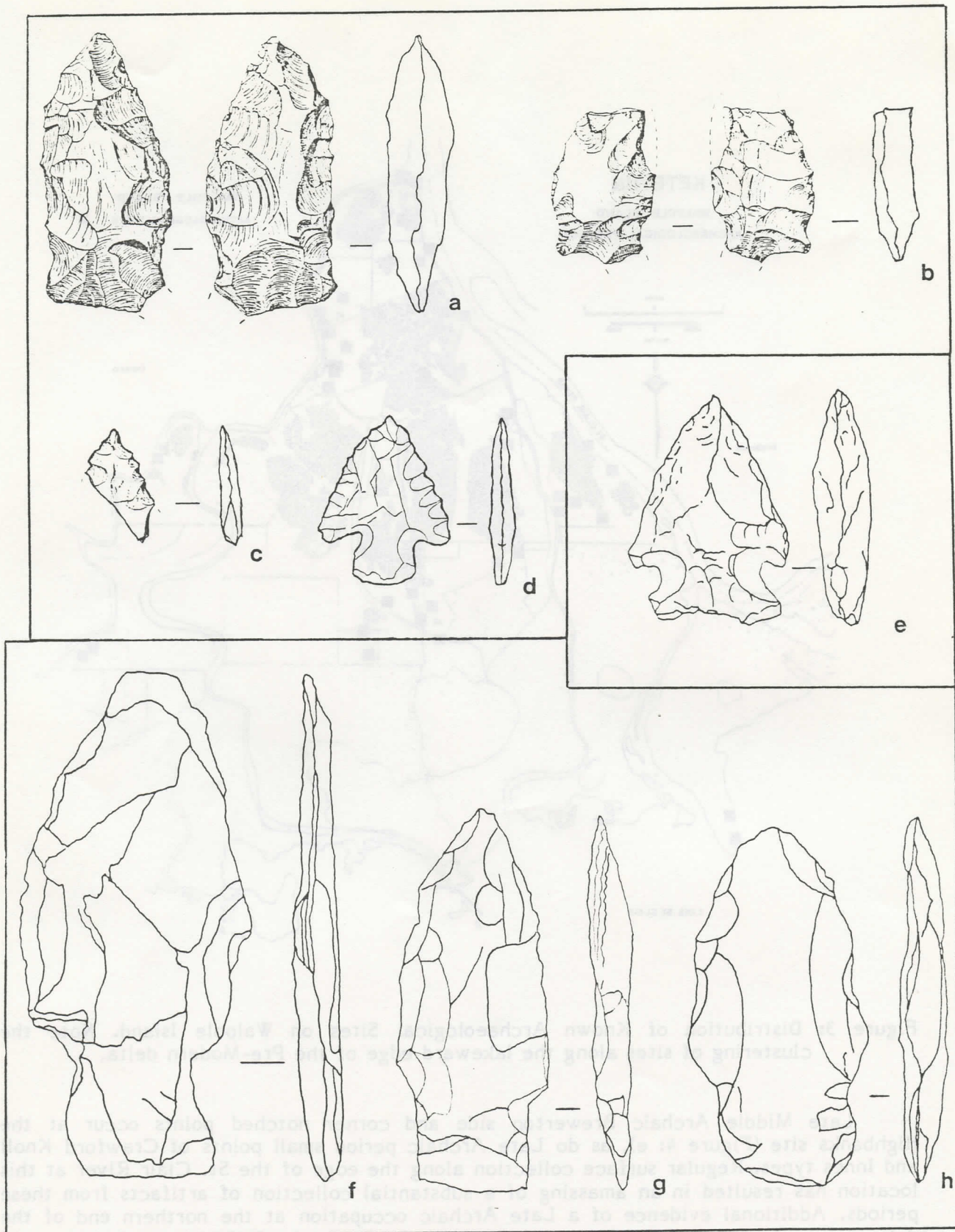


Figure 4: Projectile Points From the Highbanks Site, Walpole Island. a-d: possible Late Paleo-Indian and Early Archaic points; e: Late Middle Archaic Brewerton-like corner notched point; f-h: Late Archaic Satchell points. Artifacts d-h are from the Rocky Sands collection. All artifacts are illustrated 1:1.

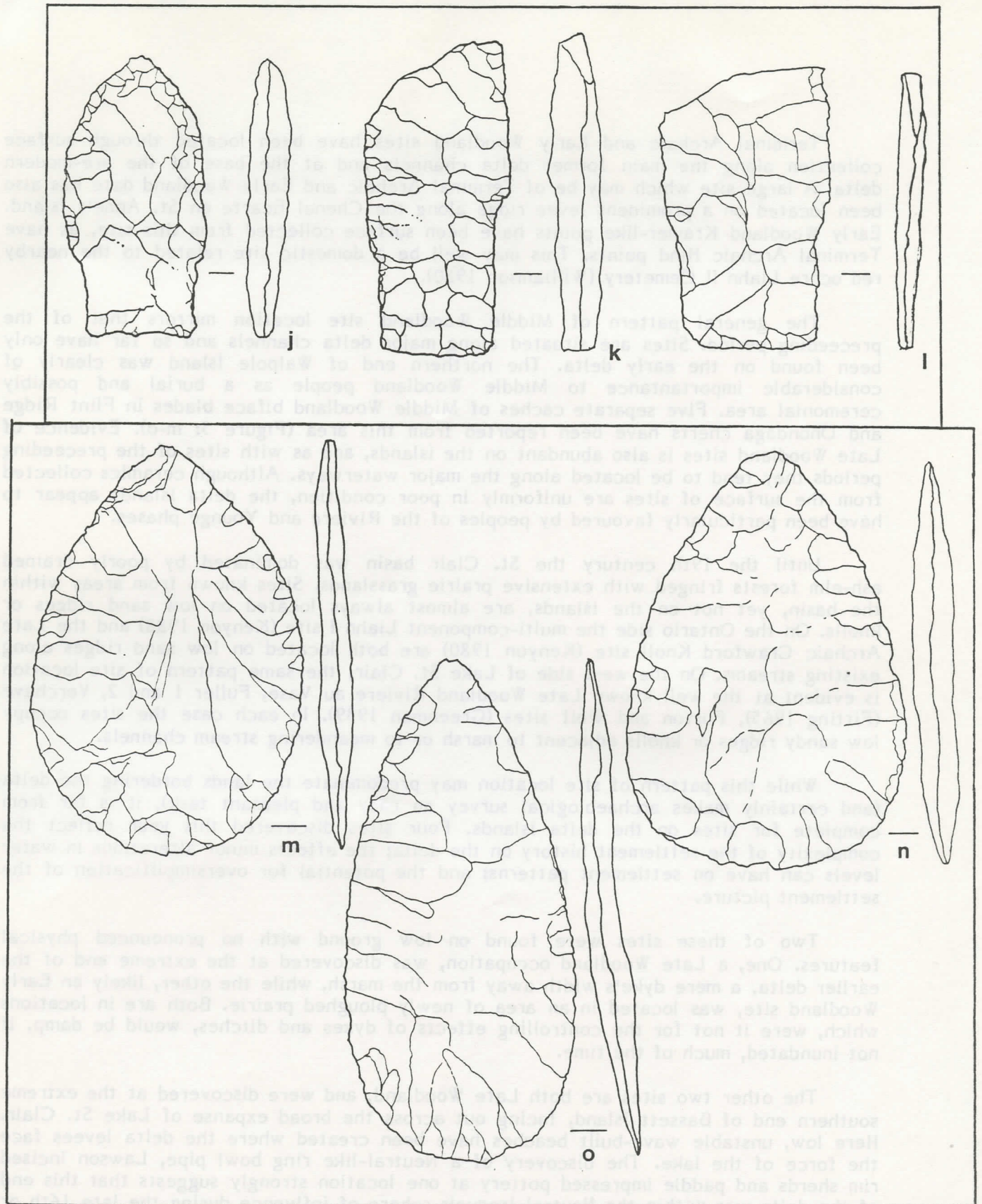


Figure 5: Projectile Points From the Highbanks Site, Walpole Island. j: Late Archaic Adder Orchard point; k-l: Late Archaic Stringtown points; m-o: Middle Woodland cache blades. All artifacts are from the Rocky Sands collection, and are illustrated 1:1.

Terminal Archaic and Early Woodland sites have been located through surface collection along the main former delta channels and at the base of the pre-modern delta. A large site which may be of Terminal Archaic and Early Woodland date has also been located on a prominent levee ridge along the Chenal Ecarte on St. Anne's Island. Early Woodland Kramer-like points have been surface collected from this site, as have Terminal Archaic Hind points. This may well be a domestic site related to the nearby red ochre Liahn II Cemetery (Williamson 1980).

The general pattern of Middle Woodland site location mirrors that of the preceding period. Sites are situated along major delta channels and so far have only been found on the early delta. The northern end of Walpole Island was clearly of considerable importance to Middle Woodland people as a burial and possibly ceremonial area. Five separate caches of Middle Woodland biface blades in Flint Ridge and Onondaga cherts have been reported from this area (Figure 5: m-o). Evidence of Late Woodland sites is also abundant on the islands, and as with sites of the preceding periods they tend to be located along the major waterways. Although ceramics collected from the surface of sites are uniformly in poor condition, the delta islands appear to have been particularly favoured by peoples of the Riviere and Younge phases.

Until the 19th century the St. Clair basin was dominated by poorly drained ash-elm forests fringed with extensive prairie grasslands. Sites known from areas within the basin, yet not on the islands, are almost always located on low sand ridges or knolls. On the Ontario side the multi-component Liahn I site (Kenyon 1988) and the Late Archaic Crawford Knoll site (Kenyon 1980) are both located on low sand ridges along existing streams. On the west side of Lake St. Clair, the same pattern of site location is evident at the well known Late Woodland Riviere au Vase, Fuller 1 and 2, Verchave (Fitting 1965), Furton and Wolf sites (Greenman 1939). In each case the sites occupy low sandy ridges or knolls adjacent to marsh or to meandering stream channels.

While this pattern of site location may predominate the lands bordering the delta (and certainly makes archaeological survey an easy and pleasant task), it is far from complete for sites on the delta islands. Four sites discovered this year reflect the complexity of the settlement history on the delta; the effects minor alterations in water levels can have on settlement patterns; and the potential for oversimplification of the settlement picture.

Two of these sites were found on low ground with no pronounced physical features. One, a Late Woodland occupation, was discovered at the extreme end of the earlier delta, a mere dyke's width away from the marsh, while the other, likely an Early Woodland site, was located in an area of newly ploughed prairie. Both are in locations which, were it not for the controlling effects of dykes and ditches, would be damp, if not inundated, much of the time.

The other two sites are both Late Woodland, and were discovered at the extreme southern end of Bassett Island, facing out across the broad expanse of Lake St. Clair. Here low, unstable wave-built beaches have been created where the delta levees face the force of the lake. The discovery of a Neutral-like ring bowl pipe, Lawson incised rim sherds and paddle impressed pottery at one location strongly suggests that this end of the delta was within the Neutral Iroquois sphere of influence during the late 16th or early 17th centuries. Interestingly, the pipe from Bassett Island is almost identical to an example excavated from the Wolf Creek site near Chatham (Foster 1982: 39, Figure 7f).

The presence of these four sites suggest that to gain a complete appreciation of

the factors which influenced site selection on the delta is a daunting task, for many of the sites which are now high and dry on the pre-modern surface may well have been just above the waterline, and subject to seasonal or sporadic inundation during the period of occupation. Sites dating to more recent times, or which relate to special activities within the massive marshes, may prove even more elusive. While surveying for sites by examining all knolls and ridges is profitable, it certainly fails to provide a complete picture of the prehistoric human occupation on the Walpole Island Reserve.

Summary

Conditions for the formation of a delta at the north end of Lake St. Clair may have occurred as many as three times in the past. However, radiocarbon dated samples of organic material from between the delta sediments and the underlying clay substrate indicate that the delta is no more than 9,300 years old. Since the only time when conditions have been right for delta formation since that time occurred as a result of the Nipissing transgression, the delta can be no more than 5,500 years old. Thus, since emergence of the delta head will have occurred sometime after initial deposition began, a Terminus Ante Quem for the human settlement of the delta islands of approximately 5,000 B.P. is suggested. This is largely supported by the archaeological findings from the islands, although a few enigmatic lithic specimens may cast some doubt on this assertion. Continued examination of materials recovered from the islands should confirm or refute the significance of these few 'pre-delta' items.

The earliest archaeological sites so far discovered occur at or near the northern tip of the islands, with subsequent settlement spreading southward in response to changing geological and environmental conditions. Relatively minor fluctuations in the level of Lake St. Clair can bring about significant changes to delta environment, and this is clearly reflected in the patterns of prehistoric settlement across the delta.

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